

Soybean Cyst Nematode– Get Out Into Your Fields and Sample and Scout!

Paul Esker, Nancy Koval, Craig Grau, John Gaska, and Shawn Conley
UW-Madison, Departments of Plant Pathology and Agronomy

Soybean cyst nematode (SCN) is the most important plant pathogen of soybean, causing an estimated annual loss of 1 to 4 million bushels of soybean in Wisconsin in recent years (Source: Wrather and Koenning. 2006. Journal of Nematology 38: 173-180). Currently, SCN has been found in 44 of 72 Wisconsin counties (Fig. 1). In an effort to improve grower's awareness of soybean cyst nematode, the Wisconsin Soybean Marketing Board has been partnering with the University of Wisconsin to conduct a grower outreach and sampling program. This program has aimed to increase grower awareness regarding the risk of SCN and how to most effectively sample for the presence of SCN. In 2007, 187 soil samples were processed for SCN.

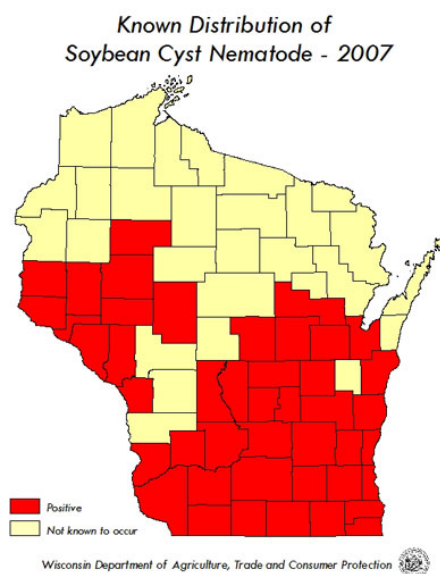


Fig. 1. Distribution of soybean cyst nematode in Wisconsin in 2007 (Source: Wisconsin Department of Agriculture, Trade and Consumer Protection).

What's the purpose for taking an SCN sample?

Soybean management plans will differ depending on the presence or absence of SCN on your farm. Scouting your fields for SCN is important in order to devise the most effective management strategies, including the use of SCN resistant cultivars and crop rotation. Sampling for SCN is something that can be accomplished prior to planting, during the growing season, and after harvest. The timing of such sampling is often dependent on your goals. These goals may include: (i) determining the presence of SCN in a field, (ii) determining if your current management program is effective, (iii) determining if a poor yield was due to SCN, and (iv) determining if in-season stand issues (such as stunted or yellowing

plants) are due to SCN. For the first three situations, soil sampling will help to determine if SCN was present or a cause of poor productivity, while for the fourth situation, the examination of soybean roots will help determine if SCN is present in your fields. Important to understand is that the absence of SCN in a soil or root sample does not guarantee that SCN is not present in your field, rather, it may mean that the organism is at an undetectable level that can quickly change within one crop of soybean.

Areas to consider for scouting

The most effective approach to sampling for SCN is to understand the risk areas where SCN may first occur, especially if the field has never been scouted before. The higher risk areas include: (i) field entrances, (ii) areas that have previously or are prone to flooding, (iii) areas with high soil pH (7.0 or greater), (iv) areas where weed control has been less effective, (v) areas where yield was lower than was expected when soybean was last grown, and (vi) along fence lines where wind-blown soil has accumulated.

Soil sampling for SCN

Soil samples can be obtained at anytime during the year, but it is recommended to avoid sampling of both frozen and heavily saturated soils. The recommended method for collecting a soil sample for submission to a diagnostic laboratory is as follows (Fig. 2) (Adapted from www.plantpath.wisc.edu/soyhealth/scnsamp.htm):

1. Use a soil probe or narrow-bladed trowel or shovel. Soil cores should be obtained at a depth of 8 to 10 inches, discarding the upper 2 inches especially if that soil is dry. If sampling in soybean, collect soil samples that contain roots.
2. One soil sample should be obtained for a 10-acre field, or from areas that are suspected to have SCN. A representative soil sample for a field is obtained by collecting from 12 to 20 soil cores from different areas of the field. It is recommended to take soil cores using a zig-zag pattern when sampling the whole field. If sampling from suspected areas, sampling at the margins and not the center is recommended.
3. The individual soil cores should be obtained from uniform areas of the field for soil texture and cropping history. If field differences exist, we recommend taking a separate set of soil cores for the different areas of the field.
4. Bulk the soil samples into a single sample (approximately 1-2 pints of soil). Place the combined samples into a sturdy plastic or soil sample bag. Label the samples accurately.
5. Samples can be sent to either a private laboratory or to the Plant Disease Diagnostic Clinic at UW-Madison. The current charge for a SCN analysis is \$22. Laboratories may measure different life stages of the nematode, including juvenile, cysts, and/or eggs. For example, the Plant Disease Diagnostic Clinic reports egg numbers. A good resource for interpreting the results of the test can be found at www.extension.iastate.edu/Publications/IPM61.pdf.



Fig. 2. Soil sampling for SCN in soybean and corn stubble (Image Source: G. Tylka, Iowa State University).

Field scouting for SCN

The first rule of plant sampling for SCN is to never pull the plant out of the soil. Dig plants out of the soil using a shovel, as it is critical to keep the root mass intact (Fig. 3). Which plants should you sample? The most straightforward approach is to dig out soybean plants that are yellow and/or stunted, but keep in mind that SCN can be present in fields where plants do not express these two symptom types, especially if the field has never been sampled for SCN before. With the soybean plant in your shovel, gently remove soil debris away from the roots and examine roots for the presence of SCN females. Soybean cyst nematode females are much smaller than nitrogen-fixing nodules and taking on white to light yellow color and lemon-shaped appearance. Sampling for SCN in the field is best accomplished approximately 6 weeks after planting and can continue up until around 3 to 4 weeks before harvest. Earlier sampling is preferred as it is easier to dig roots from the soil.





Fig. 3. Sampling for SCN during the growing season (Image Source: C. Grau, UW-Madison). Use a shovel instead of pulling plants out by hand, as it is very important to keep as much of the root mass intact as possible. Remove soil gently from the roots and examine for the presence of SCN females. Soybean cyst nematode females are lemon-shaped and either white to light yellow in color and are much smaller than nitrogen-fixing nodules.

For further information

The Wisconsin Soybean Marketing Board has funded the creation of a SCN DVD entitled: Soybean Cyst Nematode Management (A3848). This DVD has important information concerning yield losses due to SCN, the lifecycle of SCN, proper scouting and identification of SCN, inspecting the roots for SCN, management, and rotation to reduce SCN populations, the role of variety selection and SCN resistance, and future implications of SCN for Wisconsin soybean production. The DVD is available at <http://learningstore.uwex.edu/> at a cost of \$15.00 plus shipping. For additional information regarding this DVD please contact Shawn Conley (608) 262-7975 or spconley@wisc.edu.